

Enclosure 4
Letter, Felton to Jackson
Dated: July 27, 1998

**DEPARTMENT OF ENERGY
OPERATIONAL READINESS REVIEW OF
RESUMPTION OF ENRICHED URANIUM OPERATIONS, PHASE A1,
AT THE OAK RIDGE Y-12 PLANT**



**Final Report
Volume I**

May 1998

**U.S. Department of Energy
Washington, D.C. 20585**

Executive Summary

This report documents the Operational Readiness Review (ORR) of Phase A1 processes for Enriched Uranium Operations (EUO) at the Y-12 Site. These operations include casting, machining, rolling, forming and some supporting chemical processes as defined in the Department of Energy Plan-of-Action. Buildings 9212 and 9215 are the primary facilities housing these operations. The Basis for Interim Operations (BIOs) for these buildings and related Operational Safety Requirements (OSRs) and approval documents (SER) are the foundational documents governing these operations. The review was focused on the implementation of the requirements found in these documents. Additionally, the review was guided by the twenty core requirements of the governing Order on ORRs, DOE O 425.1, Startup and Restart of Nuclear Facilities. This review was conducted during the period of May 4-14, 1998.

During the restart effort, EUO operating staff have made significant strides in the implementation of conduct of operations. The EUO operating staff were able to overcome other operational weaknesses through this commitment to conduct of operations principles. Recent changes in the authorization basis have resulted in many changes to operational requirements and procedures. While these alterations resulted in some procedural changes and confusion during the ORR, adherence to formal operating practices reduced the impact of these changes. The matrix organizations conduct crucial safety basis implementation activities in support of EUO operations. These matrix organizations have not progressed to the conduct of operations level of the EUO operations staff. Their support of EUO surveillance activities must be upgraded prior to restart.

The criticality safety evaluation process has been improved and, if it continues to be effectively implemented, should result in valid and defensible requirements for EUO operation. The criticality safety organization must continue to improve, questioning and challenging their own results internally. Translation of evaluations into clear succinct requirements must continue to improve. Lack of clarity in these requirements was a contributor to the original shutdown.

Numerous factors have resulted in several recent changes to the safety basis implementing requirements for EUO operations. These recent modifications have lead to barriers in the demonstration of startup readiness which must be overcome. Several systems important to safety were not operable, and remain inoperable. The EUO management chose to approach safety system functionality on a component vice a system basis. This lead to situations where the status of systems important to safety was not clearly understood. The in-plant configuration of the Casting Furnace Cooling Water System would not support the safety function of the system. Additionally, ventilation systems surveillances did not properly test the function of the system necessary to mitigate the most significant release scenarios. Criticality Accident Alarm System (CAAS) surveillances currently do not test all system functions important to safety. The recent safety basis changes were not well understood by the shift management personnel, though good conduct of operations discipline prevented any violations during the review.

This ORR began with the understanding that the list of open pre-start items committed to by LMES was large. Much remains to be done to complete these corrective actions. The open list remains at over 100 items. While the current system appears to be effective in bringing issues to true closure, progress remains slow. The issues completed to date are more straight forward than those remaining to be closed. Appropriate root cause analysis was not conducted on several findings from the LMES ORR. Based on numerous problems previously identified with the corrective action process, efforts should be made to build on the momentum that has been established.

Given the issues identified above, the ORR team recommends proceeding with the restart of EUO operations only under the following conditions: 1) corrective actions from the LMES pre-start list are completed, closed, and **independently** reviewed; 2) corrective actions for pre-start findings from the DOE ORR are completed, closed, and closure approved by YSO; and 3) resolution of issues regarding function and operability of safety systems is **independently** reviewed. When the above recommended actions are completed, the ORR team recommends proceeding with the restart process.

Pre-Start Findings

- | | |
|-------|--|
| CM2-1 | Lack of confidence that drawings adequately reflect the actual configuration of systems. |
| FP3-1 | EUO has not requested that the Authority Having Jurisdiction (AHJ), the Oak Ridge Operations Office, evaluate the acceptability of using flashlights during fissile operations. |
| MG1-1 | There was no well defined schedule for issue closure and as a result it was not possible to fully evaluate the results of the closure process. |
| MG2-1 | Root cause analyses were not conducted for LMES ORR findings as required by the LMES EUO Restart Plan, Y/MA-7243. |
| MT1-2 | The EUO maintenance backlog exceeds 1200 jobs and has not been evaluated for its impact on safety, as required. |
| MT2-1 | OJT instructor qualifications for several maintenance OJT instructors have lapsed and the impact on maintenance personnel qualifications is not known. |
| OP5-1 | Y-12 Laboratories, including the B-1 Wing Lab and the Analytical Services Organization's plant lab, did not provide adequate support to operations to ensure proper criticality safety control with operation of the high capacity evaporator. |
| OP5-2 | Conduct of Operations practices have not been effective in identifying deficiencies associated with the acceptability of completed surveillance test data. |
| SE1-1 | Assumptions and controls identified in the BIO safety analysis for the facility ventilation systems have not been included in the OSRs as part of the facility safety basis. |
| SE1-2 | The material at risk that was assumed in the analysis of some accidents may not match the material at risk that is allowed in the process. |
| SE2-1 | Safety systems necessary to support operations with enriched uranium are not operable. |
| TR2-1 | The EUO processes and procedures are not adequately implemented to ensure that all operations, maintenance, and support personnel have completed their qualification, certification, and proficiency requirements. |

I, by signature here, acknowledge that I concur with the TEAM LEADER and SENIOR ADVISOR in the findings and conclusions of this report of the EUO Phase A, Resumption of Enriched Uranium Operations at Oak Ridge Y-12 ORR in my assigned functional area.



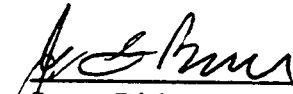
Dawn Kristensen
Configuration Management/
Engineering Support



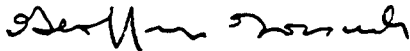
Douglas Outlaw
Criticality Safety



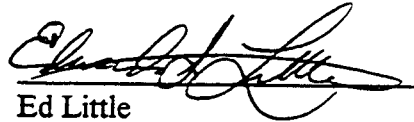
Kevin Buchanan
DOE-OR



James Bisker
Fire Protection



Geoffrey Gorsuch
Industrial Safety



Ed Little
Management



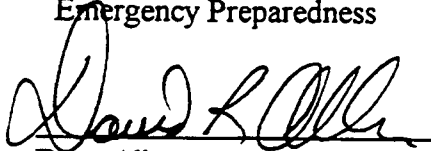
Jim Winter
Maintenance



Doug Dearolph
Operations/Procedures/
Emergency Preparedness



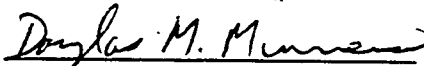
Rick Ledtje
Operations/Procedures/
Emergency Preparedness



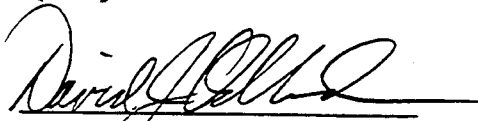
Dave Allen
Operations/Procedures/
Emergency Preparedness



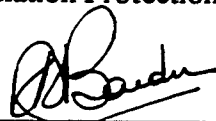
Paul Chimah
Quality Assurance



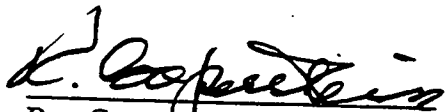
Doug Minnema
Radiation Protection



Dave Odland
Safety Envelope

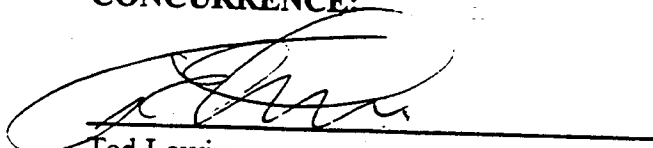


Bob Baeder
Training



Ray Cooperstein
Waste Management

CONCURRENCE:



Ted Lewin
Senior Safety Advisor

May 20, 1998

Date

APPROVED:



Jeffrey L. Roberson
Team Leader

5/21/98

Date

TABLE OF CONTENTS

Executive Summary	i
1.0 INTRODUCTION	1
1.1 Background	2
1.2 Facilities under Review	2
2.0 SCOPE AND OBJECTIVES	3
3.0 OVERALL APPROACH	4
3.1 Operational Readiness Review Team	4
3.2 Conduct of the ORR	4
3.3 ORR Documentation Process	5
3.3.1 Forms	5
3.3.2 Finding Classification	6
4.0 SUMMARY OF FINDINGS	6
4.1 Summary of Results	6
4.2 Functional Area Summaries	7
4.3 ISMS Implementation	24
4.4 Lessons Learned	28
VOLUME II	Forms 1 & 2
VOLUME III	Implementation Plan and Qualification Summaries

OPERATIONAL READINESS REVIEW FOR THE PHASE A RESUMPTION OF RESUMPTION OF ENRICHED URANIUM OPERATIONS AT OAK RIDGE Y-12

1.0 INTRODUCTION

The Department of Energy (DOE)-Oak Ridge Operations (ORO) Office Manager directed that an Operational Readiness Review (ORR) be conducted in accordance with DOE O 425.1, *Startup and Restart of Nuclear Facilities*, prior to authorization to resume Phase A1 Enriched Uranium Operations (EUO) at the Oak Ridge Y-12 Plant. This report documents the results of that ORR.

The facilities involved in this restart process enriched uranium from dismantled nuclear weapons into a form suitable for long term storage; produce or recover enriched uranium from research reactor fuel; recover enriched uranium from salvage materials to support accountability; and provide purified metal to non-weapons customers.

The EUO restart will be conducted in two phases. The first, Phase A, is the subject of this ORR and involves restarting operations for the accountability and casting functions of Building 9212, and the machining, rolling, and forming functions of Building 9215. The designation as a restart is the result of a contractor directed stand-down that has lasted more than one year. DOE O 425.1 requires the successful completion of contractor and DOE ORRs and resolution of identified issues prior to restart of an existing Category II nonreactor nuclear facility shut-down of more than one year.

Phase A was subdivided into two phases, A1 and A2. Phase A1 covers the metal working (casting, machining, rolling, and forming) operations and some supporting accountability processes. Phase A2 covers the remaining Phase A accountability processes. The specific processes and systems included in each phase are identified in Table 1 of the LMES Plan-of-Action (POA) (Rev. 3, dated 16 Jan, 1998). Programmatic aspects of both phases were covered during Phase A1 to the maximum extent possible. Final decisions regarding the scope of the A2 programmatic reviews will be based on the results of this report and the closure of identified issues.

The DOE conducted this ORR in conformance with the ORR POA and as described in the Implementation Plan (IP). The Manager, ORO, selected an ORR Team Leader who in turn selected the Senior Safety Advisor and approved Technical Experts for the ORR. This group formed the team membership who developed the scope, schedule, and Criteria Review and Approach Document (CRAD).

The Oak Ridge site is a government-owned contractor-operated (GOCO) site northwest of Knoxville, Tennessee. Lockheed-Martin Energy Systems (LMES) is contracted to manage and operate the site.

1.1 Background

In September of 1994, personnel in the container storage operations were observed violating criticality safety controls associated with material storage arrays at Y-12. The area was not immediately placed under required control and neither the Nuclear Criticality Safety Department nor the Plant Shift Superintendent were notified as required by plant training and procedures. After an investigation, Y-12 management imposed a general stand-down on most activities, including those in EUO. The stand-down was intended to provide time for improvements in organizational performance and management of safety in daily operations.

1.2 Facilities under Review

The facilities being restarted in Phase A are the operations areas in Buildings 9212 and 9215 of the EUO Organization. This ORR focused on those operations identified as Phase A1 in the DOE POA for a Process Based Restart. Building systems important to the maintenance of the safety envelope and which support these Phase A1 operations were also subject to review. Process changes and facility modifications were made during the stand-down to upgrade performance or bring individual processes into compliance with requirements as specified in the safety basis documentation. Both Buildings 9212 and 9215 are classified as Hazard Category 2.

Building 9212

Casting Operations Area. The enriched uranium casting operation uses vacuum-induction casting furnaces, metal shearing and breaking, light machining, and casting by-product handling.

Accountability Operations Area. The enriched uranium accountability operations are performed by bulk reduction, dissolution, and evaporation. Enriched uranium is placed in cans and safe bottle arrays for in-process storage. The dissolution process is supported by the chemical makeup, organic treatment, and nitric acid and aluminum nitrate cycle operations located in another building. Uranium oxides are produced from an uranyl nitrate solution using dissolution, precipitation, furnaces, and particles-sizing processes conducted within the building. Shipping and receiving are also conducted at this building.

Ancillary operations (such as exhaust fans) are located in adjacent buildings, in C-Wing, or on the Building 9212 roof. Radiography and density inspections are performed in Building 9981.

Building 9215

Machining Operations. The enriched uranium machining operations are conducted in M-wing of the building. They are performed on numerically-controlled/manually-operated lathes, mills, borers, and grinders. Significant support equipment for these operations includes chuck vacuum

and machining coolant systems. The enriched uranium chips produced by machining operations are transported to Building 9212 for further processing or storage. The uranium chip processing includes cleaning, drying, and briquetting prior to recasting.

Rolling and Forming Operations. Enriched uranium rolling and forming are performed in the "O" wing of Building 9215. Equipment and operations necessary to produce a wrought part include the following: molten salt baths, a rolling mill, water rinse systems, mechanical leveling and shearing, heat treatment ovens, hydro form, and several material conveyance devices. Dimensional inspections are performed in an adjacent building.

2.0 SCOPE AND OBJECTIVES

An ORR is a disciplined, systematic, documented, performance-based examination and verification of line management's ability to achieve, prove, and document readiness of the facility or process to conduct work safely. The DOE ORR was conducted using a performance-based review approach. It did not duplicate nor was it redundant with the LMES ORR.

The DOE ORR focused on an assessment of the scope, adequacy, and accuracy of the LMES ORR process to verify readiness of hardware, personnel, and management programs for operations. The LMES ORR provided the primary basis for acceptance of readiness. The DOE ORR assessed the scope of the contractor ORR and included actual verification of a sampling of contractor ORR results. The DOE ORR assessed the effectiveness of the contractor's preparations through actual demonstrations of normal operations, abnormal events, emergency drills, etc. The DOE ORR also assessed the readiness of responsible DOE line organizations to safely manage operations and the effectiveness of coordination among organizations.

The current EUO Organization was established in August 1997. It is the landlord for Buildings 9212 and 9215 and is the responsible organization for overall facility safety. Two tenants, the Product Certification Organization and the Analytical Services Organization, operate processes that will be started during Phase A1. Responsibilities and interfaces between EUO and the two tenants are defined in plant procedures and landlord/tenant agreements. The definition and functionality of these responsibilities and interfaces were reviewed as part of the ORR. The tenants' processes (including procedures, training, and qualification) were also under the purview of this ORR.

Other Y-12 organizations were included in the scope of this ORR only as their services actively support processes and activities associated with restart.

The breadth of the ORR was defined in the POA and also reflected in the IP for Resumption of EUO Operations at Y-12, including the core requirements specified in DOE O 425.1.

The depth of the ORR was defined in the CRAD which is found in Appendix 2 of the Implementation Plan. The CRAD served as the principal means by which the ORR team verified the readiness of systems, processes, personnel, and management programs to restart safely.

3.0 OVERALL APPROACH

3.1 Operational Readiness Review Team

Prior to commencement of onsite ORR activities, training of team members was conducted and consisted of site and facility familiarization, necessary radiological and safety training for facility access, facility program status, and familiarization with the ORR IP and associated CRADs. Each team member had previous assessment experience or appropriate training. No team member had any connection with Phase A1 EUO operations that impacts their independence to review assigned functional areas. By their selection, the Team Leader certified that each Team Member is technically competent, has assessment experience, is independent and familiar with the facility. These qualifications are formally documented in Volume III of this report.

Briefings on the conduct and results of the ORR were provided to the Manager, ORO for information and to help form a basis for a decision regarding restart. The Manager, ORO may grant permission to commence operations based on the recommendation of the ORR team and resolution of the findings. Briefings were also presented to key senior managers, and others as requested or deemed necessary.

3.2 Conduct of the ORR

Prior to the Approval Authority's approval to commence the DOE ORR, the team reviewed the scope of the LMES ORR to determine its adequacy and completeness. This review of their scope assisted in the development of the DOE ORR's CRAD. The CRAD provided the defined bases for conducting the ORR within the context of the scope set forth by the Core Requirements of DOE O 425.1. The breadth of the ORR is defined in the DOE POA which amplifies the core requirements through the use of core objectives, and provides the geographic scope of the facilities supporting the processes to be restarted which are subject to this review. It is through the criteria specified in the CRAD that each of the applicable Core Requirements of DOE O 425.1 is evaluated. Each CRAD identifies, by number, the Core Requirements that it addresses.

The CRAD for the enriched uranium ORR was developed using the guidance provided in Appendix 4 of DOE-STD-3006-95. The criteria are based on the combined expertise of the Team Members, DOE orders, and other requirements, the potential hazards of EUO operations, and the input of internal and external review groups.

A graded approach, as described in Appendix 1 of DOE-STD-3006-95, was used to select the elements for this DOE ORR. Factors such as relative importance to safety, magnitude of hazards involved, complexity of the activity or operation, magnitude of risk, confidence in site-wide programs, frequency and depth of internal and external reviews of programmatic areas were considered during the development of the CRAD. Each ORR Team Member developed CRADs for their areas of review responsibility.

The ORR was conducted using a performance-based review approach. A performance-based review is a systematic approach of evaluation based on the level of adequacy and effectiveness at which requirements have been established and implemented for the level of knowledge and skills required for competent job performance. Three basic methods of appraisal were used during the field verification: interviews, document reviews, and observations. Identification of the method of appraisal for each focus area was included in the CRAD. Consistent with the DOE POA, the DOE ORR started with an assessment of the adequacy and accuracy of the LMES ORR. The DOE ORR looked closely at the effectiveness of the contractor's preparations through actual demonstrations of normal operations, abnormal events, and emergency drills as well as verification of DOE line management's readiness.

A Senior Advisor was assigned to this ORR to: (1) assist the Team's leadership in the exercise of their responsibilities; (2) provide guidance to the Team Members; (3) identify the issues to be addressed during the ORR; (4) approve the CRAD; and (5) assist the Team leader in writing the Final ORR Report.

Quality assurance of the review process was the responsibility of the Team Leader and the Senior Safety Advisor and includes Team Leader approval of all DOE ORR Team Members, and daily onsite review of the findings of the Team Members. Coordination with the Office of Environment, Safety, and Health (EH) was conducted via staff interaction in accordance with the requirements of DOE O 425.1.

3.3 ORR Documentation Process

During the onsite review, documentation of strengths or weaknesses and the assembly of objective evidence of operational readiness was the responsibility of the Team Members. Each Team Member's assessment from his review was submitted to the Team Leader and Senior Safety Advisor via Assessment Forms (Form 1) and Deficiency Forms (Form 2), where applicable. Their recommendation, based on their functional area review regarding the readiness to restart enriched uranium operations was included.

3.3.1 Forms

Form 1, the Assessment Form, was used to document the methods and actions taken by a Team Member in their criteria evaluation process. Each Form 1 is designed to cover a specific objective and lists the means the Team Member used to measure the site's performance relative

to the objective provided in the CRAD. Each Form 1 is complete enough for an outside agency reviewing the form to follow the inspection logic and means used to verify the site's performance with respect to the objective and validate the ORR's completeness and adequacy. Any deviation from the described CRAD is explained. The conclusion specifies whether the particular objective was met.

Form 2, the Deficiency Form, was used to document the issues identified during the review and evaluation process. A Form 2 was generated for each issue related to a particular objective identified as requiring corrective action.

3.3.2 Finding Classification

A single issue or a group of related issues which have been documented on Form 2's may constitute a finding. The Team Leader and Senior Safety Advisor, in consultation with the applicable Team Member, had the responsibility for making the determination of whether a finding was pre-start or post start. Appendix 3 of the IP provides the criteria used to aid in this determination. Each final Form 2 documents this determination.

4.0 SUMMARY OF FINDINGS

4.1 Summary of Results

This review assessed the ability of LMES to safely conduct Phase A1 enriched uranium operations along with DOE's ability to effectively oversee these activities. These operations will be conducted primarily in buildings 9212 and 9215; therefore the review focused on the controls identified in the BIOs, SERs, and OSRs for these facilities. Fifteen functional areas were assessed by the review team which identified 12 pre-start findings, 15 post start findings, and 5 observations.

During this review, the ORR team evaluated identified nonconformances and schedules for gaining compliance with applicable DOE Orders, Secretary of Energy Notices, and Standards/Requirements Identification Documents (S/RIDs). In all cases, the identified nonconformances or schedules for gaining compliance were understood, evaluated, and formally approved. In the opinion of the ORR Team, upon correction of the pre-start findings identified in this report, adequate protection of the public health and safety, worker safety, and the environment will be maintained.

Flowdown of requirements in the safety basis documents have not been fully implemented and tested. Specifically, not all controls identified in the hazards analysis have been included for implementation in facility documentation. For example, ventilation system surveillances did not provide assurance that the system operated as assumed in the safety analysis. Additionally, design features important to safety were not, in all cases, identified, maintained, and controlled.

Material at risk in the operational processes was not always controlled to be less than that assumed in the analysis. LMES was unable to demonstrate the requested surveillance activity for the stack 3 ventilation system due to inadequate validation and verification of the implementing procedure by operations and maintenance personnel.

A review of pre-start A1 packages for items in the issues tracking database indicated that an adequate root cause analysis had not been conducted for some issues. Further, it was not possible to fully evaluate the issues management closure process due to the large number of open pre-start findings at the start of the DOE ORR. The number of open EUO pre-start findings was not reduced significantly during the ORR observation period.

At the time of the review, the maintenance backlog items had not been evaluated for their impact on the safe conduct of enriched uranium operations. The total maintenance backlog exceeded 1250 jobs, of which over 850 are overdue. The size of the backlog has not been reduced in over 12 months. Additional items should be added to the A1 punchlist if appropriate based on the analysis results of the maintenance backlog.

Improvements in criticality safety are recognized; however, continued improvements are necessary. The flowdown of criticality safety controls from evaluations to implementing documents is crucial to safe enriched uranium operations. The ORR revealed that safety controls have been effectively identified in criticality safety requirements and have been incorporated into procedures, postings, and drawings. Criticality safety personnel have a thorough understanding of the potential accident scenarios and the controls in place to prevent accidents.

Conduct of operations is a recognized strength in support of safe enriched uranium operations which has enabled the operating staff to overcome operational weaknesses in other areas. This strength has been challenged by recent changes to the safety basis documents resulting in the modification of operational requirements and procedures. For example, some ORR demonstrations were halted appropriately by the operators, exercising conduct of operations principles. One example of a halted operation resulted from a discrepancy between the action called out in the procedure and the physical configuration of a component.

Some EUO support organizations need to progress in their approach to disciplined operations. During one operation, there were chemicals used in analyses that had surpassed their expiration date. Subsequent interviews revealed that support personnel were aware of the situation, but had not ensured that the expired chemicals were removed from the facility and that in date chemicals were available for use. Problems with proper conduct and completion of surveillance procedures by support organizations were also noted.

A summary for each functional area included in the review is provided below along with a list of the findings and observations for each.

4.2 Functional Area Summaries

CONFIGURATION MANAGEMENT (CM)

The objective for the review of this functional area was to ensure that adequate controls are in place to ensure appropriate configuration control of modifications, repairs, and design changes as related to facility systems.

The configuration management program as described in the site implementing documents is well defined, roles and responsibilities of individuals and organizations are clearly delineated, and necessary organizational interfaces are identified. Personnel interviewed demonstrated an appropriate level of knowledge of the configuration management program established at EUO. Individuals were cognizant of their roles and responsibilities as defined in the requirements documents.

The EUO organization utilizes a master equipment list for delineating all equipment which has been assigned a Structure, System, and Component (SSC) designation, a listing of safety systems and components has not been developed. SSC grades are assigned according to the safety function of the equipment. This approach has resulted in some difficulties in program implementation by placing the focus of changes on components in lieu of changes to safety systems with clearly defined boundaries.

During the planning phase for modifications to a valve, LMES personnel identified inconsistencies between the drawings and the physical configuration of a safety system. It was determined that the actual configuration of this system did not meet the design intent for the safety function of the specific component in question. Additionally, numerous discrepancies were identified in system drawings during other walkdowns conducted by LMES during the ORR following this discovery. While these drawing discrepancies were less significant, the number of discrepancies indicate a possible systemic weakness in the control of safety significant systems.

During a process demonstration, the operation was halted due to a discrepancy between the procedure and the physical configuration of some components. Review of the associated change package revealed that the procedure had not been identified as one of the documents affected. The change control process does address the need to identify documents requiring modification due to a proposed change but does not provide the initiator or reviewers with a "tickler" list of potentially affected documents in the change control forms. The process relies almost totally on individual knowledge of the systems/components being changed and associated documents.

With adequate closure of the pre-start finding listed below, the Configuration Management functional area will support the safe resumption of Phase A1 operations.

Findings: Pre-Start

CM2-1 Lack of confidence that drawings adequately reflect the actual configuration of systems.

Findings: Post Start

CM2-2 Need to strengthen the change control process for identification of affected documents.

CRITICALITY SAFETY (CS)

The objective of the review of this area was to confirm that a Criticality Safety program is established, sufficient numbers of qualified, knowledgeable personnel are provided, and that adequate criticality safety controls are identified in safety documentation and fully implemented.

The criticality safety organization is established and functioning to support the EUO organization. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, and effectively implemented. It has adequate facilities and equipment. Staffing levels directly supporting EUO Phase A1 operations are adequate.

The criticality safety engineers supporting Phase A1 are qualified and knowledgeable of facility operations and hazards. They also give adequate attention to health, safety and environmental protection issues.

During interviews, criticality safety support personnel demonstrated their understanding of their roles and responsibilities. They clearly have a good working knowledge of the facility and the systems required to support resumption of Phase A1 operations. Interviews with the facility engineering and operations supervisors supporting Phase A1 operations also indicated they were well aware of potential criticality safety accidents and the controls put into place to prevent them. They were also well aware of who to call upon if they had criticality safety questions or concerns.

Discussions with operations staff during evolutions, drills, and walkdowns indicated that they were well aware of the potential accident scenarios and the controls that were in place to prevent the accidents. They were also knowledgeable of the importance of the procedural steps that are in place to implement the controls.

The criticality safety system supporting EUO operations has improved significantly since the last Readiness Assessment. The criticality safety controls have now been effectively identified in CSRs and implemented in operating procedures, postings, and drawings. The principal area of weakness remaining is in the documentation of the basis for criticality safety in evaluations.

The Criticality Safety functional area will support the safe resumption of Phase A1 operations.

Finding: Post-Start

CS1-1 Criticality Safety Evaluations for Phase A1 processes did not always contain sufficient information for independent review.

EMERGENCY PREPAREDNESS (EP)

The objective of the review of this area was to confirm that an Emergency Preparedness program is established, sufficient numbers of qualified and knowledgeable personnel are provided, adequate emergency preparedness controls including a drill program has been established and implemented.

Review of the emergency plans and procedures, memoranda of understandings, and organization charts of the emergency management program organization (EMPO) confirmed that an emergency preparedness program is established. A review of the training records indicates that sufficient numbers of qualified personnel are provided, and field observations demonstrated that facilities and equipment are available to ensure emergency preparedness is adequate for safe operations.

Examinations, examination results, and interviews with EMPO, PSS and facility personnel confirmed their level of knowledge is adequate to provide an effective emergency response for all classes and categories of emergency.

Records of the completed drills and exercises confirmed that an emergency operations drill program has been established and implemented. A field observation of a limited external exercise including the pre-drill brief and post-drill critique, provided sufficient evidence that the program provides an adequate emergency response, and lessons learned are captured for continuous improvement.

The Emergency Preparedness functional area will support the safe resumption of Phase A1 operations.

ENGINEERING SUPPORT (ES)

The objective of the review of this area was to determine whether adequate engineering support is provided, a sufficient number of qualified personnel are provided, and facilities and equipment are available to ensure engineering services support safe operations. The review assessed the knowledge of engineering support personnel and reviewed the status of implementation of USQ requirements.

Engineering support is provided for enriched uranium operations both internally and externally by the EUO organization and the central engineering organization, respectively. This has been effective in providing an adequate number of support personnel. Additionally, the facilities and equipment used by engineering personnel are adequate to provide support for operations.

Minimum entry-level requirements have been established for engineering support personnel. Training records indicated that these requirements have been met. There is no formal training designed for engineering support personnel for the EUO facilities or systems. Knowledge of systems is obtained largely by conducting system walkdowns, drawing review, document review, and verbal communication. LMES actively encourages professional licensing among the engineering community at Y-12. Approximately 75-80% of the engineers are registered professional engineers.

Requirements for the USQ process have been incorporated into implementing documents. Change packages reviewed contained the appropriate level of USQ documentation. The documentation provided clear discussion of the scope of the change and its affects (if any) to the process, equipment and systems. Justifications were provided describing why changes did not affect the safety envelope for EUO. Personnel responsible for initiating, reviewing, and approving USQ determinations and screens articulated a thorough knowledge of the objectives of the USQ process and their roles and responsibilities. Personnel responsible for reviewing change requests adequately understood the importance of the USQ process in relationship to the change control process.

The Engineering Support functional area will support the safe resumption of Phase A1 operations.

FIRE PROTECTION (FP)

The objective of this functional area review was to determine that a fire protection program was established; sufficient numbers of qualified personnel were provided; adequate facilities and equipment were available; the level of knowledge of fire protection support personnel was adequate; and that the fire protection program met required standards.

An effective fire protection program is established. There are sufficient numbers of qualified personnel assigned and facilities are adequate. The level of knowledge of fire protection support personnel is acceptable.

A compensatory measure to the Life Safety Code, NFPA 101, to use flashlights has been established due to deficiencies with emergency lighting. An evaluation of this action during fissile operations has not been requested from the Authority Having Jurisdiction (AHJ), the Oak Ridge Operations Office.

Compensatory measures established to provide egress from the 9212 roof area are not adequate as there are many obstructions, lack of lighting, and inadequate signage.

Data on fire protection system performance has not been adequately collected and maintained as required by an approved equivalency determination.

The Fire Protection functional area will support the safe resumption of Phase A1 operations upon correction of the pre-start finding.

Findings: Pre-Start

FP3-1 EUO has not requested that the Authority Having Jurisdiction (AHJ), the Oak Ridge Operations Office, evaluate the acceptability of using flashlights during fissile operations.

Findings: Post Start

FP3-2 Compensatory measures currently in place for the roof egress from 9212 are not adequate.

FP3-3 Data on fire protection system performance has not been adequately collected and maintained as required by an Equivalency Determination.

INDUSTRIAL SAFETY (IS)

The objectives of the review for this area were to verify that occupational safety and industrial hygiene programs were established, sufficiently staffed with qualified personnel, and supported by adequate facilities and equipment; and that the level of knowledge of operations support personnel and the implementation status of the S/RIDs were both adequate.

Required occupational safety and industrial hygiene programs that support EUO operations are satisfactory with no deficiencies or findings identified. Support personnel are educated, trained, and very experienced in their technical specialties and in the facilities. Safety facilities and equipment are appropriately selected, maintained, and tested, and are adequate to support EUO operations.

Resumes and training records indicate that the operations support personnel have adequate training and experience to support EUO operations.

The Occupational Safety and Industrial Hygiene functional area will support Phase A1 operations.

MANAGEMENT (MG)

The objective of this functional area review was to assess the implementation of the contractor's issue management systems; to evaluate the adequacy of the contractor's ORR; to determine the status of the DOE standards program including occurrence reporting processes, to assess the status of the safety culture; to ascertain whether functions, assignments, responsibilities, and reporting relationships are clearly defined, understood and effectively implemented; and to evaluate the adequacy of the start up plan.

Issues management programs had recently been revised to increase management attention to resolving and closing issues. These programs were rigorous in detail and execution. However, there was an extensive number of issues being managed and there was no well defined schedule for issue closure. As a result it was not possible to fully evaluate the results of the closure process.

The contractor's ORR was adequately planned and implemented. The team assembled to conduct the ORR was well qualified. The results of the ORR were of significant depth and factual accuracy. The scope of the ORR was not sufficient in one area. The fire protection functional area was not specifically evaluated even though numerous fire protection issues were known to exist. Closure of ORR findings was inadequate as root cause analyses for the ORR deficiencies had not been conducted as required by the EUO Restart Plan, and only 3 of 28 pre-start findings for the LMES ORR had been closed at the beginning of the DOE ORR.

A positive safety culture was demonstrated during the ORR. There was strong emphasis placed on safety matters from senior line management through the middle managers. Evidence that this safety culture had permeated to the floor level processes was not always demonstrated. There were several instances observed in normal and non routine operations where inappropriate safety related direction and responses occurred.

Functions, assignments, responsibilities, and reporting relationships were well understood and effectively implemented. Several staff positions in the issues management area were filled by personnel on loan. Management reviews were not always effectively conducted. An excessive number of Memorandum of Understanding were in place in the EUO facilities.

The start up plan was reviewed and determined to be adequate. No integrated long range schedule had been prepared which could provide managers with a full scope view of progress and planning factors such as the status of attainment of personnel qualification, certification, or proficiency.

The Management functional area will support the safe resumption of Phase A1 operations upon correction of the pre-start findings.

Findings: Pre-Start

- MG1-1 There was no well defined schedule for issue closure and as a result it was not possible to fully evaluate the results of the closure process.
- MG2-1 Root cause analyses were not conducted for LMES ORR findings as required by the LMES EUO Restart Plan, Y/MA-7243.

Findings: Post Start

- MG2-2 The scope of the corporate ORR was not adequate. The fire protection functional area was not evaluated.
- MG5-1 The EUO issues management group is inadequately staffed and may not perform effectively when personnel on loan are removed.
- MG5-2 A Management Review conducted during the ORR was not conducted in a timely manner and was chaired by a Shift Technical Advisor who demonstrated a lack of understanding of the technical aspects of the issue.

Observations:

- MG5-3 There is an excessive number of Memorandum of Understanding (MOU) in place at the EUO facilities.

MAINTENANCE (MT)

The objective of this review was to confirm that a Maintenance program is established, sufficient numbers of qualified, knowledgeable personnel are provided, adequate facilities and equipment are available to ensure maintenance services are adequate for safe operation, and implementation of DOE 4330.4B and associated S/RIDs are adequate for operations.

The functions, responsibilities, and coordination of the Facilities Management Organization (FMO) with respect to the Enriched Uranium Operation (EUO) are clearly defined and implemented in the FMO Management Charter, DP Maintenance Department Charter, Maintenance Programs and Administrative Services Charter, and the MOUs between EUO and FMO. FMO has adequately staffed and qualified a maintenance organization and a maintenance planning organization that is co-located and well integrated within EUO. In addition, FMO routinely provides general plant maintenance support (painters, insulators, etc.) through a central organization that addresses the training and qualification needs of EUO while also serving the

entire Y-12 complex. The FMO Manager and his direct reports have a strong commitment to fully support EUO and understood their roles with respect to the maintenance program. The matrix organization is effective in maintaining programmatic consistency within EUO.

The EUO maintenance backlog exceeds 1200 jobs and has not been evaluated for its impact on safety, as required. The latest performance data on the maintenance backlog is a total of 1254 actions with 853 actions overdue. The backlog has increased by 20% over the past seven months and has not been reduced in number for 12 months. The MOU has established a maximum desirable level of 1200 items and requires an assessment by the Operations Managers to determine if Enriched Uranium Operations may be conducted if this level is exceeded. This assessment has not been done to determine the cumulative impact of this backlog on A1 restart as required (MT1-2). One additional finding related to work control in the area of post maintenance testing was noted (MT1-1).

OJT instructor qualifications for several maintenance OJT instructors have lapsed and the impact on maintenance personnel qualifications is not known. The individuals trained under OJT instruction for the CAAS/ENS and Fire Protection Systems is in question. The qualification status of personnel trained under these areas needs to be understood and resolved prior to restart (MT2-1).

The Maintenance functional area will support the safe resumption of Phase A1 operations upon correction of the pre-start findings.

Findings: Pre-Start

MT1-2 The EUO maintenance backlog exceeds 1200 jobs and has not been evaluated for its impact on safety, as required.

MT2-1 OJT instructor qualifications for several maintenance OJT instructors have lapsed and the impact on maintenance personnel qualifications is not known.

Findings: Post-Start

MT1-1 The process to approve post maintenance testing to verify the design functions of a safety related system was inadequate.

Observations:

MT1-3 Quality Services, in support of EUO, have no formal assessment program for counterfeit/suspect parts and instead, rely on the AVID (Accelerated Vendor Inventory Delivery) Vendor contract and informal inspections.

MT1-4 Lifted electrical leads were not logged as required during the troubleshooting and repair of a safety related system.

OPERATIONS (OP)

Operations were reviewed to determine if the knowledge of operations personnel and the facility condition is adequate to support safe phase A1 resumption. Document reviews, shift evolutions, and interviews were reviewed and assessed to determine if facility equipment and personnel have an adequate and practical understanding of the safety envelope, procedures and conduct of operations. DOE Order 5480.19, "Conduct of Operations" was used to determine if phase A1 conduct of operations was sufficient to resume operations. The operations drill program was reviewed to determine if it is established and is working effectively. Personnel were interviewed and observed in the performance of their jobs to determine if they demonstrated a high-priority commitment to public and worker safety, health and environmental requirements. The viability of procedures and the training of operators was reviewed to determine if LMES was ready to resume phase A1 activities. Minimum staffing levels were also assessed to see if qualified and trained individuals were available to resume and maintain safe operations in the phase A1 facilities.

Operations personnel were interviewed concerning their level of knowledge in the areas of criticality safety fundamentals, conduct of operations requirements, procedures, and health safety, and environmental awareness. The interviewers concluded that the level of knowledge is adequate to support phase A1 operations. The attitude of personnel with respect to the importance of criticality safety and conduct of operations requirements was excellent. Several operations evolutions were observed to evaluate LMES's readiness to resume A1 activities. It was concluded that operations personnel have been properly trained to safely perform their jobs. Support personnel however, demonstrated weaknesses in conduct of operations principles during the evolutions and surveillances reviewed by the ORR Team.

The phase A1 drill program was reviewed and several operational drills were observed. The routine drill program was evaluated as demonstrating an adequate response to abnormal conditions. However, numerous weaknesses were determined to exist in the preparation and conduct of drills. The drill program is characterized as being immature and in need of additional line management leadership to effect continuing improvement.

A review of the minimum staffing requirements as defined by the Operational Safety Requirements (OSRs) was conducted and determined to be adequate. The OSR did document the minimum staffing requirements for the safety systems covered by the PSS office and the Fire Department. Field observations and interviews indicated that the minimum staffing requirements were known and practices were demonstrated where the shift manager ensures these are satisfied prior to commencing activities germane to the requirements.

The Operations functional area will support the safe resumption of Phase A1 operations upon correction of the pre-start findings.

Findings: Pre-Start

OP5-1 Y-12 Laboratories, including the B-1 Wing Lab and the Analytical Services Organization's plant lab, did not provide adequate support to operations to ensure proper criticality safety control with operation of the high capacity evaporator.

OP5-2 Conduct of Operations practices have not been effective in identifying deficiencies associated with the acceptability of completed surveillance test data.

Findings: Post start

OP2-1 The routine drill program is immature, lacks appropriate definition for goals and objectives and does not receive full support from line management.

OP6-1 Several of the procedures used in evolutions were inaccurate or did not contain the appropriate hold points or steps.

DOE-OR (OR)

The objective of the review of this area was to confirm that the DOE-ORO Y-12 Site Office (YSO) has established a team of technically competent individuals to provide the necessary level of oversight of the Enriched Uranium Operations (EUO) facility.

YSO has established an organization which is documented in Procedure YSO-1.2, Organization and Responsibilities, and authorities are further defined in the Functions, Responsibilities, and Authorities Matrix (FRAM, Manual 411.1-1A). The organization consists of a YSO Site Manager, a YSO Acting Site Manager, seven qualified Facility Representatives (four of which are qualified for EUO), a team of program managers, and two separate teams of Subject Matter Experts (SME's). The Facility Representatives are assigned to cover field activities on a daily basis, and the SME's provide periodic field coverage for areas within their expertise.

YSO has developed and implemented a Facility Representative program which meets, and exceeds, the requirements of DOE STD-1063-97. YSO Facility Representatives are knowledgeable of the operations of their assigned facilities, their associated safety bases, and past incidents and occurrences. All Facility Representatives possess a firm grasp of the principles of good Conduct of Operations, and they fully understand their responsibilities associated with Stop Work Authority.

YSO requirements for implementing S/RID assessments are documented primarily in two procedures. YSO-3.5, "Review of Requests for Approval for Noncompliance to Standards/Requirements Identification Documents," and YSO-9.2, "Contractor Oversight," provide the guidance required for S/RID assessments. Additionally, these two procedures reference the Master Assessment Plan (Procedure YSO-1.9), which is the tool by which S/RID assessments are scheduled, assigned, and completed. The assessment guidance contained in YSO-9.2 is adequate for ensuring assessors look at their assigned areas and evaluate the effectiveness of the contractor's implementation of standards and requirements.

Subject Matter Experts have been trained in at least an overview format to understand the facilities to which they are assigned, they understand the safety bases, they spend a good deal of their time within the facilities, and like Facility Representatives they understand their responsibilities associated with Stop Work Authority. YSO personnel have adequate technical expertise to properly oversee LMES operations and to perform restart oversight activities.

ORO has implemented a Management Walk-Around Program in accordance with the requirements of DOE-ORO O 420, Chapter IV, "Conduct of Operations Requirements for DOE Facilities," paragraph 5. This paragraph provides guidance for scheduling, conducting, and documenting management walk-throughs. The program is mandatory at Y-12 as a result of a commitment established in response to DNFSB Recommendation 94-4. YSO has implemented a management walk-through program via Procedure YSO-9.6, Management Walk-Around Surveillances. Quarterly schedules have been distributed to identify when members of management must conduct a walk-around in the field. Personnel indicate that these walk-arounds are usually, but not always, completed, and that results of these walk-arounds are often documented by emails distributed to the responsible parties. Walk-Around Program records, however, do not indicate that these walk-arounds are being performed. Little documentation exists indicating that the Walk-Around Program has been effectively implemented.

It is noted that YSO has established a computerized system through which they track open issues. This system, known as the Deficiency Tracking System (DTS), is an excellent system which is simple to use and effective in ensuring YSO personnel maintain cognizance over their outstanding items and follow them through closure. All YSO personnel are kept aware through their own computer systems of the status of their items in DTS, and they are reminded daily when they have issues awaiting action. The DTS system is a model which could be utilized by other DOE site offices.

The DOE-OR functional area will support the safe resumption of Phase A1 operations.

Findings: Post Start

OR3-1 ORO has not properly implemented the requirements of the Management Walk-Around Program as stipulated in ORO O 420, Facility Authorization, and YSO has not properly implemented YSO-9.6, Management Walk-Around Surveillances.

QUALITY ASSURANCE (QA)

This review confirmed a Quality Assurance program is established, sufficient numbers of qualified, knowledgeable personnel are provided, adequate facilities and equipment are available to ensure quality assurance services are adequate for safe operation, and implementation of DOE 5700.6C, 10 CFR 830.120, and associated S/RIDs are adequate for operations.

The Engineering, Test, and Inspection (ET&I) program lacks continuity between Operations and Quality Services. The lack of documentation (i.e., NCRs) and communication of status is a major problem in dispositioning and implementing corrective action on the non-conforming items. The legacy of rejected equipment by Quality Services and communication problems between these two organizations has caused both organizations to lose control over the equipment monitored by the ET&I program.

The LMES QA Rule Implementation Plan requires management assessment. More than three years have passed since the approval of the QA Rule Implementation plan, yet a management assessment has not been completed. Interviews with senior managers indicate that management assessment is scheduled to start in July 1998.

The Quality Assurance functional area will support the safe resumption of Phase A1 operations.

Findings: Post Start

QA1-1 The control, disposition, and implementation of corrective actions on equipment in the ET&I program at EUO is not being performed as required.

QA3-1 LMES management assessment program is not fully implemented.

RADIATION PROTECTION (RP)

The objective of the review of this area was to confirm that a Radiation Protection program is established, sufficient numbers of qualified, knowledgeable personnel are provided, and that adequate radiation protection controls are identified in safety documentation and fully implemented.

Facility specific information and requirements that relate to safe operations, such as Operational Safety Requirements (OSRs), engineered systems such as ventilation systems, and process specific descriptions are not formally incorporated into the RCT training program in support of EUO operations. This information is important to the RCT in establishing a level of knowledge necessary to perform radiation protection functions adequately at the facility. An informal process of mentoring between RCTs experienced in the facilities and newer RCTs has resulted in

achieving some degree of familiarity. However, only 5 out of the 18 RCTs supporting EUO were at the facility when it last operated, this process is not formal, and no expectations have been established for it.

The procedure *Radiological Work Permit*, RCO/Y-FO-400, Rev. 1, dated August 29, 1997, is noteworthy in the amount of supplemental information and methodologies provided to assist the user in developing effective RWP's.

The working relationship between the RADCON organization, the occurrence investigation and reporting organization, YSO, and the EUO operations organization is noteworthy in its efficiency and effectiveness in identifying, analyzing, reporting, and responding to occurrences.

The Radiation Protection functional area will support the safe resumption of Phase A1 operations.

Findings: Post Start

RP2-1 RCT Training does not incorporate sufficient facility and process specific technical information as it relates to safe operations.

Observations:

RP1-1 The procedure, *Radiological Work Permit*, RCO/Y-FO-400, Rev. 1, 8/29/97, is noteworthy in the amount of supplemental information and methodologies provided to assist the user in developing effective RWP's.

RP1-2 The working relationship between the RADCON organization, the occurrence investigation and reporting organization, YSO, and the EUO operations organization is noteworthy in its efficiency and effectiveness in identifying, analyzing, reporting, and responding to occurrences.

SAFETY ENVELOPE (SE)

The objective of the review in this functional area was to ensure that the facilities have safety documentation in place that describes the "safety envelope" for each of the buildings in the complex, to verify that there is a program in place to periodically confirm the condition and operability of the facilities' safety systems, and to verify that the operating limits in the "safety envelope" are correctly implemented in the operating procedures.

The safety basis documentation for Buildings 9212 and 9215, including the Basis for Interim Operation (BIO), the Operational Safety Requirements (OSRs), and the Safety Evaluation Reports (SERs), was reviewed. The safety basis documentation has gone through several iterations since it was first approved in 1997. The 9212 BIO is on revision 2 and the OSRs are

currently at revision 4. The 9215 BIO is on revision 1 and the associated OSRs are currently at revision 2. Each of the revisions has been reviewed and approved by DOE YSO after the completion of an SER.

The analyzed accidents in each of the BIOs for Buildings 9212 and 9215 were reviewed and the assumptions and controls associated with each of the accident scenarios were identified. Then, the OSRs and building programs and procedures were reviewed to verify that the key assumptions and controls identified in the safety analysis were implemented. During the review, it was noted that the systems and components necessary to ensure that ventilation flow is maintained as assumed in the safety analysis, and the surveillances and tests necessary to ensure that the systems and components continue to perform these safety functions have not been included in the BIO and OSRs. It was also noted that some processes may allow higher amounts of material than the assumptions for material at risk that were used in the analysis.

The scheduling procedure and systems that are used to periodically confirm the operability of the safety systems were also reviewed. The surveillance requirements from the OSRs were reviewed to verify that the testing requirements were incorporated into the scheduling system. No discrepancies were noted. The personnel responsible for the scheduling database, particularly at Building 9212, were found to be very knowledgeable and professional.

Surveillance procedures were reviewed and surveillances observed to verify that the procedures could be executed in a step-by-step manner and that the acceptance criteria conform to the OSR Bases, system descriptions, and accepted industry standards. In addition, the process for the conduct of surveillances was observed to verify that adequate reviews are conducted to identify and resolve any discrepancies that are identified during the surveillance process. During the review of the CAAS surveillance procedures, some deficiencies in the functional testing and in the acceptance criteria were noted. In addition, it was not possible to observe the operation or surveillance testing of the E-Wing Dry Vacuum System, since the system was not operable during the ORR. Review of completed surveillances indicated that past reviews of the completed surveillances have not always been effective in identifying discrepancies in the performance of the surveillance procedures.

A number of operating and maintenance procedures were reviewed to verify that the requirements of the LCOs were implemented in these procedures and that the safety-related parameters contained in these procedures were verifiable. No significant discrepancies were noted.

The Safety Envelope functional area will support the safe resumption of Phase A1 operations upon correction of the pre-start findings.

Findings: Pre-Start

- SE1-1 Assumptions and controls identified in the BIO safety analysis for the facility ventilation systems have not been included in the OSRs as part of the facility safety basis.
- SE1-2 The material at risk that was assumed in the analysis of some accidents may not match the material at risk that is allowed in the process.
- SE2-1 Safety systems necessary to support operations with enriched uranium are not operable.

Findings: Post Start

- SE1-3 The assumption in the safety analysis that the hydraulic oil in use in O Wing is highly resistant to fire is not included as a Design Feature for Safety in the 9215 OSR.
- SE2-2 The surveillance test procedure for the CAAS does not include testing and acceptance criteria for all the system's safety related functions.

TRAINING (TR)

The objective of the review of this functional area was to determine if the Enriched Uranium Operations (EUO) Training and Qualification Programs can safely support EUO operations.

The EUO training support organization is adequately established and functioning to support the operations organization. The corrective actions and expected improvements now initiated by the new EUO Training Manager should strengthen the performance of the organization. EUO is adequately staffed with qualified training personnel, and the EUO line management has adequately demonstrated that they understand their responsibility for the implementation of the training and qualification program for all of the EUO Operators, Maintenance, and Support Personnel for the EUO Phase A1 operations.

The most significant problem observed in this ORR and previous reviews is the management of qualification progress. The scope of this problem is illustrated by the ten Training Findings (six Pre-Start and four Post Start Findings) of the recently completed LMES Operational Readiness Review (LMES ORR), and the eight Training Findings (six Pre-Start and two Post Start Findings) of the DOE Y-12 Site Office Assessment (YSO). Both of these assessments were completed in April 1998.

Considering the breadth, depth, and context of all of those training findings, they indicate problems associated with ensuring exactly who is qualified, provisionally qualified, qualified/certified, provisionally qualified/certified, and due for requalification, periodic

evaluation, or who are fully qualified and proficient. These deficiencies were indicated in all personnel areas including EUO Operators, Maintenance, Support Personnel, and the EUO Mentors.

While those YSO Pre-Start Training Findings were reported to have been entered into the official LMES/Y-12/EUO closure process as of about April 30, 1998, the corrective actions for the LMES ORR Pre-Starts and their respective closures are now in progress, some of those actions realistically only started on May 4, 1998, the first day of this ORR. The corrective actions are also primarily directed specifically only for the EUO Phase A1 Minimum Staffing Levels personnel. The results of this ORR support and confirm those Training Findings respectively reported by the DOE YSO Assessment and the LMES ORR. Thus, it was too early during this ORR to determine if these corrective actions and similar actions initiated very recently at EUO have or should fix the problem of the "management of qualification." From these and other past Y-12, YSO, and LMES assessments, there were indicators of problems in the qualification area.

The EUO processes and procedures are not adequately implemented to ensure that all operations, maintenance, and support personnel have completed their qualification, certification, and proficiency requirements.

The training and qualification programs encompass the range of duties and activities required to be performed. The new EUO Training Manager has recently initiated many changes to improve the organization, administration, and operation of EUO Training.

The Training functional area will support the safe resumption of Phase A1 operations upon correction of the pre-start findings.

Findings: Pre-Start:

TR2-1 The EUO processes and procedures are not adequately implemented to ensure that all operations, maintenance, and support personnel have completed their qualification, certification, and proficiency requirements.

WASTE MANAGEMENT AND ENVIRONMENTAL PROTECTION (WM)

The objective of the review for this area was to determine that the waste management and environmental protection programs are established, sufficient numbers of qualified personnel are provided, and facilities and equipment are available to ensure operational support services are adequate to sustain safe operations.

Personnel associated with the Waste Management and Environmental Programs are experienced in the activities having many years of service in the facilities and familiarity with the equipment to ensure safe operations.

Training records and interviews with these personnel demonstrated the level of knowledge was adequate to support operations.

The Waste Management and Environmental Protection functional area will support the safe resumption of Phase A1 operations.

4.3 ISMS Implementation

Observations Concerning Integrated Safety Management (ISMS) at EUO Phase A1 Facilities

While the purpose of this ORR was not intended to evaluate ISMS for the site or as it pertains to EUO facilities, the ORR Team developed some observations concerning ISMS during the ORR at EUO facilities. The following comments are provided for information as they may pertain to future ISMS reviews at the Y-12 Site.

The Y-12 ISMS System Description was not reviewed or referenced during the ORR, nor did the team use ISMS objectives, functions, or principles in their lines of inquiry. It is not intended to reach any conclusions concerning the adequacy of the Y-12 ISMS System Description based on these comments.

The following discussion addresses pertinent comments of the ORR as they pertain to ISMS Functions and Guiding Principles:

- Scope of Work and Balanced Priorities. No specific comments were developed concerning the adequacy of the scope of work and balanced priorities ISMS functions and principles. The ORR did not evaluate the flow down of the contractor's budget process or work priority assignment system into the EUO facilities.
- Analyze Hazards. The establishment of the authorization basis and associated hazard analyses were fully evaluated in the criticality safety and safety envelope functional areas. Worker safety hazards analyses were evaluated in the industrial safety, maintenance, operations, and radiation protection functional areas. The forms 1 and 2 for these areas document the extent of the hazard analyses reviews. Some topics of interest in these forms which are of importance to ISMS include:

- Safety Basis documents (CSEs, BIOs, OSRs) were the subject of several corporate ORR and DOE ORR findings. The DOE ORR reports that the approach used to review safety concerns is based primarily on a component level perspective rather than a system level perspective. This resulted in some decisions in declaring operability of safety systems based on limited system data.
- Safety and health hazards are evaluated through a variety of means including job hazard analyses (JHAs), work permits, and health hazard assessments. Supplementary JHAs are also being performed for many AI activities. Draft JHAs reviewed were of limited scope.
- Job hazard screening for hazards conducted by maintenance planners in the preparations of maintenance job request (MJRs) was well conducted.
- The Radiological Work Permit (RWP) program is noteworthy.
- The criticality safety program was evaluated as improved since past readiness reviews. Some deficiencies in the criticality safety evaluations were reported in the corporate ORR but were adequately resolved.

• Development and Implementation of Controls. Development and Implementation of Controls ISMS functional area was evaluated extensively in the criticality safety, safety envelope, industrial safety, maintenance, operations, and radiological protection functional areas. The forms 1 and 2 for these areas document the extent of the review of the implementation of controls. Some topics of interest in these forms which are of importance to ISMS include:

- Compliance with the site-wide S/RIDS program has been effectively verified. There are few RFAs and CSAs in place. Compensatory actions are well defined.
- Criticality safety controls have been effectively identified in criticality safety requirements and are effectively implemented in operating procedures, postings, and drawings.
- The site-wide electrical safety program may not be fully adequate. During the ORR it was observed that control of lifted leads was informal. There is an EUO memorandum on the subject, but no site-wide direction. Control of electrical troubleshooting is often relegated to "skill of the craft".

- Perform Work and Operations Authorization. The perform work and operations authorization functions and principles were evaluated in the management, operations, industrial safety, radiation protection, maintenance, configuration management, and engineering support functional areas. Some topics of interest in these forms which are of importance to ISMS include:
 - There is a lack of confidence in the facility drawings as they do not adequately reflect the actual configuration of systems. Work control and engineering support personnel do not always adequately compensate for this shortcoming by conducting thorough system walkdowns.
 - During the ORR, authorization of work by the Shift Manager was adequately demonstrated. Plans of the Day (PODs) were thorough and effective. Maintenance and operations personnel complied with the PODs.
 - The maintenance backlog for EUO facilities is excessive and the backlog is not effectively managed.
 - Good Conduct of Operations practices were challenged by recent changes to the Safety Basis. Several safety related surveillances during the ORR and some process operations were not performed or reduced in scope. These deficiencies were not identified by the appropriate managers.
 - Draft Authorization Agreements (AAs) prepared in anticipation of the restart activities at EUO do not specifically authorize the specific systems and processes to be restarted.
- Feedback and Improvement. The feedback and improvement function was evaluated in the management, operations, maintenance, safety envelope, criticality safety, and radiation protection functional areas. Some topics of interest in these forms which are of importance to ISMS include:
 - Significant issues management deficiencies and the lack of timely conduct of management reviews are noted in the management functional area. The newly chartered Operational Safety Board (OSB) for EUO was noted to be effective. OSBs are reported to be established in most of the nuclear operations facilities.
 - An effective feedback and improvement program has significantly enhanced the criticality safety program. The program is now significantly improved as compared to past readiness assessments.

- A pilot program in use for the Facilities Maintenance Organization (FMO) entitled "I care. We care." was presented as a good example of a site-wide program to incorporate employee concerns and to provide a process for identifying and acting on safety deficiencies. This program is on the site-wide web and appears to be very user friendly. It may serve as a good example of a worker feedback program which can be shared across the complex.
- Line Management Responsible for Safety. This ISMS principle was evaluated in the management, operations, safety envelope, criticality safety, and maintenance functional area. Some topics of interest in these forms which are of importance to ISMS include:
 - The ORR evaluated that the line management as augmented by the Process Based Restart staff was effectively carrying out safety responsibilities.
 - The Issues Management Prioritization and Risk Board (IMPRB), which serves the quality organization's needs to evaluate the significance of issues in the issues management program, is reported to abrogate the manager's responsibility for safety in the management functional area.
- Assignment of Roles and Responsibilities. This ISMS principle was evaluated in all functional areas. A topic of interest in these forms of importance to ISMS includes:
 - The Process Based Restart (PBR) Managers were aggressively managing the issues closure process and were providing top level guidance for operation of the EUO facilities. Once restart is declared, it is unclear whether the EUO staff, without assistance from the PBR managers, will be adequate to manage many of the facility problems. This is specifically discussed in the management area with respect to issues management. The concern may be broader than the issues management problems and may need to be more fully evaluated from an ISMS perspective during the ISMS verification process.
- Competence Commensurate with Responsibility. This ISMS principle was evaluated in all functional areas. Some topics of interest in these forms which are of importance to ISMS include:
 - Operator qualification and certification programs were not effectively managed. The status of qualification was not well documented. There is a considerable backlog of qualifications which may impact the efficient return to normal operations.
 - Process engineers had limited direction, training, and experience in the development of post maintenance testing.

- Engineering support personnel are not trained or adequately familiarized on EUO facilities or systems.
- The YSO Facility Representative (FR) Program is well established and effective. EUO FRs are visible and interact well with facility managers and workers.
- Several comments were made concerning implementation and integration mechanisms.
 - There are an excessive number of Memoranda of Understanding (MOUs) in place at the EUO facilities. This number of MOUs may indicate that the site level programs are not completely integrated into the facilities.
 - Working relationships between the radiological control organization, the occurrence reporting groups, YSO and EUO operations appear to be strong.
 - Criticality safety personnel did not participate in initial Preliminary Hazards Analyses and BIO development efforts. This lack of coordination caused some duplication of effort. Reportedly this coordination has improved in the current SAR development efforts.
 - Y-12 laboratories, including the B-1 Wing Laboratory and the Analytical Services Organization's Laboratory did not provide adequate support to EUO operations.

4.4 Lessons Learned

Control of System Level Safety Functions: The facility addressed safety systems control at a component level rather than at a systems level. As a result, the operability or the confirmation of operability of several safety systems were challenged during the review, including the ventilation and casting systems. The ventilation system in Building 9215 and the associated OSRs did not ensure that flows assumed in the BIO for certain fire scenarios were met. While many system level safety functions are confirmed by the OSRs, the lack of a systems approach to safety may have contributed to the lack of appropriate OSR control of ventilation flow checks in various locations in M-Wing. Another example was the system configuration problems identified with the casting furnaces. Detailed reviews and modifications took place just prior to the ORR to replace check valves in the casting furnace cooling water system for criticality safety concerns. However, in two of the twelve furnaces, cooling water was bypassing the check valve as a result of piping configurations for "tower water return" lines. Again, a component level view of safety rather than a system level view. Built in assurances like configuration control and preservation of safety functions at the system level are essential to managing the safety basis. A systems approach to safety should be considered in the operation of DOE nuclear facilities."

Scheduling of the Start of the ORR: The ORR started on May 4, 1998, a few days after LMES Operational Readiness Review (LMES ORR), completed on April 14, and the DOE Y-12 Site Office Assessment (YSO), completed on April 30, 1998. Most of the Pre-Start corrective actions were just beginning, none were completed, and it was too early to determine if the planned corrective actions had fixed the problems, or were expected to fix the Pre-Start problems.

Conduct and Scheduling of events during the ORR: Some Interviews were scheduled to begin immediately after the completion of the in-brief, and some during the drill periods. In either case this made it difficult for those Team Members who wanted to review records prior to their interviews, and for those Team Members whose interviews conflicted with observing drills.

Assignment and Substitution of ORR Team Members: Some substitute ORR Team Members had to complete additional site specific training and "entry training challenge tests" at the beginning of the ORR. This compressed their schedules for the Interviews and Record Review. Some ORR Team Members felt that they would have benefited from having additional Team Members to help them.

Utilization of Subject Matter Experts for the ORR Team: During this Y-12 ORR, the team had a Subject Matter Expert (SME) in the area of Uranium processing and materials handling, who may have been under utilized. In future ORRs an assigned SME may be more fully utilized by providing assistance and written inputs for the report to the Team Members and Team Leader.

Computer Availability for the ORR Team: There were an insufficient number of computers available for the Team Members. This was particularly noticeable in the concluding days of the ORR, when Team Members had to share computers as they completed the writing of ORR forms.